Exhibit M

IN THE U.S. PATENT AND TRADEMARK OFFICE

Appl. No.	:	11/239,706
Applicant	:	Benoist Sebire, et al.
Filed	:	September 29, 2005
TC/AU	:	2416 (confirmation no. 4364)
Examiner	:	Jason E. Mattis
Docket No.	:	859.0052.U1(US)
Customer No.	:	29683
Title	:	SLOW MAC-E FOR AUTONOMOUS TRANSMISSION IN HIGH-SPEED UPLINK PACKET ACCESS (HSUPA) ALONG WITH SERVICE SPECIFIC TRANSMISSION TIME CONTROL

Commissioner for Patents
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AMENDMENT

Sir:

In response to the non-final Office Action dated February 2, 2009, the Applicant hereby amends the above-referenced application as follows:

Amendments to the Written Description: None.
Amendments to the Drawings: None.
Amendments to the Claims: begins at page 2 of this paper.
Remarks/Arguments: begins at page 8 of this paper.
Appendix: None.

This Amendment is filed within the shortened statutory period for reply recited in the referenced Office Action, and no fee or petition for time extension is seen due. Should the undersigned representative be mistaken, please consider this as a petition for an extension of time necessary to effect his Amendment and/or charge Deposit Account No. 50-1924 for any required fee deficiency.

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in this application.

1-45. (Canceled)

46.(Currently Amended) A method comprising:

determining a virtual transmission time interval for a medium access control entity of an apparatus;

checking to determine whether the medium access control entity is transmitting data packets from the apparatus in a current air interface transmission time interval; and

for the case where it is determined that the medium access control entity is not transmitting from the apparatus in the current air interface transmission time interval, transmitting a next data packet from the apparatus after a period determined by the virtual transmission time has elapsed.

47.(Previously Presented) The method of claim 46, wherein the virtual transmission time interval comprises a minimum time interval that is allowed between uplink transmissions.

48. (Currently Amended) The method of claim 46, wherein the next data packet comprises at least one protocol data unit and the virtual transmission time interval is an integer multiple of the current air interface transmission time interval.

49.(Previously Presented) The method of claim 46, wherein checking to determine whether the medium access control entity is transmitting data packets in a current air interface transmission time interval comprises checking to determine if the medium access control entity emptied its radio link control buffer.

50.(Previously Presented) The method of claim 49, wherein transmitting comprises transmitting at least one protocol data unit from the buffer.

51.(Previously Presented) The method of claim 50, wherein transmitting the at least one protocol data unit comprises selecting a transport format combination as a function of the virtual transmission time interval.

52.(Previously Presented) The method of claim 51, wherein selecting the transport format combination is a function of occupancy of the radio link control buffer and the virtual transmission time interval.

53.(Currently Amended) The method of ~~claim 46~~ claim 50, wherein transmitting the at least one protocol data unit comprises transmitting it over a dedicated channel.

54.(Previously Presented) The method of claim 46, wherein determining the virtual transmission time interval comprises receiving from a network element the virtual transmission time interval.

55.(Previously Presented) The method of claim 46, wherein determining the virtual transmission time interval is without explicit network signaling.

56.(Previously Presented) The method of claim 46, executed by a mobile station for autonomous uplink transmission in which a scheduling grant from a network is not required.

57.(Previously Presented) A memory embodying a computer program executable by a processor for performing actions directed toward changing a transmission interval, said actions comprising:

determining a virtual transmission time interval for a medium access control entity;

checking to determine whether the medium access control entity is transmitting data packets in a current air interface transmission time interval; and

for the case where it is determined that the medium access control entity is not transmitting in the current air interface transmission time interval, transmitting a next data packet after a period determined by the virtual transmission time interval has elapsed.

58.(Previously Presented) The memory of claim 57, wherein the virtual transmission time interval comprises a minimum time interval that is allowed between uplink transmissions.

59.(Currently Amended) The memory of claim 57, wherein the next data packet comprises at least one protocol data unit and the virtual transmission time interval is an integer multiple of the current air interface transmission time interval.

60.(Previously Presented) The memory of claim 57, wherein checking to determine whether the medium access control entity is transmitting data packets in a current air interface transmission time interval comprises checking to determine if the medium access control entity emptied its radio link control buffer.

61.(Previously Presented) The memory of claim 60, wherein transmitting comprises transmitting at least one protocol data unit from the buffer.

62.(Previously Presented) The memory of claim 61, wherein transmitting the at least one protocol data unit comprises selecting a transport format combination as a function of the virtual transmission time interval.

63.(Previously Presented) The memory of claim 62, wherein selecting the transport format combination is a function of occupancy of the radio link control buffer and the virtual transmission time interval.

64.(Currently Amended) The memory of ~~claim 57~~ claim 61, wherein transmitting the at least one protocol data unit comprises transmitting it over a dedicated channel.

65.(Previously Presented) The memory of claim 57, wherein determining the virtual transmission time interval comprises receiving from a network element the virtual transmission time interval.

66.(Previously Presented) The memory of claim 57, wherein determining the virtual transmission time interval is without explicit network signaling.

67.(Previously Presented) The memory of claim 57, wherein the computer readable medium and the processor are disposed in a mobile station, and the actions are for autonomous uplink transmission in which a scheduling grant from a network is not required.

68.(Currently Amended) An apparatus comprising:

a memory adapted to store computer program instructions and a virtual transmission time interval;

a wireless transceiver;

a processor ~~coupled to the memory and to the wireless transceiver, and~~ adapted to:

check to determine whether the ~~mobile station~~ apparatus is transmitting data packets in a current air interface transmission time interval; and

for the case where it is determined that the ~~mobile station~~ apparatus is not transmitting in the current air interface transmission time interval, to cause the transmitter to transmit a next data packet after a period determined by the virtual transmission time interval has elapsed.

69.(Previously Presented) The apparatus of claim 68, wherein the virtual transmission time interval comprises a minimum time interval that is allowed between uplink transmissions.

70.(Currently Amended) The apparatus of claim 68, wherein the next data packet comprises at least one protocol data unit and the virtual transmission time interval is an integer multiple of the current air interface transmission time interval.

71.(Previously Presented) The apparatus of claim 68, further comprising a radio link control buffer coupled to the wireless transceiver,
and wherein the check to determine whether the mobile station is transmitting data packets in a current air interface transmission time interval comprises a check to determine if the radio link control buffer is empty.

72.(Previously Presented) The apparatus of claim 71, wherein the next data packet comprises at least one protocol data unit sent from the buffer to the transceiver.

73.(Currently Amended) The apparatus of ~~claim 72~~ claim 70, wherein for the case where the processor is adapted to cause the transceiver to transmit the at least one protocol data ~~unit comprises~~ unit, the processor is further adapted to select a transport format combination for the at least one protocol data unit as a function of the virtual transmission time interval.

74.(Previously Presented) The apparatus of claim 73, wherein the transport format combination is a function of occupancy of the radio link control buffer and the virtual transmission time interval.

75.(Previously Presented) The apparatus of claim 68, wherein the transmitter is adapted to transmit the next data packet over a dedicated channel.

76.(Previously Presented) The apparatus of claim 68, wherein the virtual transmission time interval is received from a network element via the wireless transceiver.

77.(Previously Presented) The apparatus of claim 68, wherein the virtual transmission time interval is determined by the processor without explicit network signaling.

78.(Previously Presented) The apparatus of claim 68, wherein the virtual transmission time interval is used for autonomous uplink transmission in which a scheduling grant from a network is not required.

79.(Previously Presented) An apparatus comprising:

means for determining a virtual transmission time interval for a medium access control entity;

means for checking to determine whether the medium access control entity is transmitting data packets in a current air interface transmission time interval; and

for the case where it is determined that the medium access control entity is not transmitting in the current air interface transmission time interval, means for transmitting a next data packet after a period determined by the virtual transmission time interval has elapsed.

80.(Previously Presented) The apparatus of claim 79, wherein:

the means for determining comprises a wireless receiver configured to receive a message from a network entity that includes the virtual transmission time interval;

the means for checking comprises a processor adapted to determine whether a radio link control buffer is empty; and

the means for transmitting comprises a wireless transmitter coupled to the processor and configured to transmit a protocol data unit only after it is determined that the period determined by the virtual transmission time interval has elapsed.

81.(Previously Presented) The apparatus of claim 68, wherein the apparatus comprises a mobile station.

82.(Currently Amended) The apparatus of claim 79, wherein the apparatus comprises a mobile station, and the virtual transmission time interval is an integer multiple of the current air interface transmission time interval.

REMARKS/ARGUMENTS:

The Office Action dated February 2, 2009 concluded as follows for the subject application:

- Claims 53, 64 and 73-74 are rejected under 35 USC 1st ¶ for antecedent basis/clarity;
- Claims 46-48, 53-59, 64-70, 75-79 and 81-82 are rejected under 35 USC 102(e) as anticipated by Sarkar (US Publ 2004/0190914);
- Claims 49-50, 60-61, 71-72 and 80 are rejected under 35 USC 103(a) as obvious over Sarkar in combination with Vrzic (US Publ. 2004/0228349); and
- Claims 51-52, 62-63 and 73-74 are rejected under 35 USC 103(a) as obvious over Sarkar in combination with Vrzic and Kim (US 7,450,555).

35 USC 112, 1st ¶:

Dependency of claims 53 and 64 are changed. Dependency of claim 73 is also changed, and claim 73 is re-worded slightly to make its meaning more clear. These amendments address the rejections under 35 USC 112 to claims 53, 64 and 73-74.

35 USC 102(e):

Claims 46, 57, 68 and 79 represent all pending independent claims, and each of these are rejected under 35 USC 102(e) in view of Sarkar. Claim 46 is amended to more clearly tie elements to a statutory class.

The rejection cites to the Figure 8 and 10 embodiments of Sarkar and its associated description at ¶¶0144-0145 and 0152-0156 (other citations for specific hardware of the apparatus claims). This disclosure of Sarkar relates to a congestion control in which there is a set rate limit. Sarkar discloses examples of the set rate limit as the mobile station's maximum allowable rate or a rate identified in the mobile station's grant to send traffic which it receives from the base station. Once there is no busy signal asserted, the current rate is checked against an upper rate limit (maximum rate, block 840 of Figure 8) and the mobile's transmission rate is increased if the current rate is lower. If the busy signal is asserted the current rate is checked against a lower rate limit (minimum rate, block 820 of Figure 8) and the mobile's transmission rate is decreased if the current rate is higher. This is repeated for each packet so the maximum and minimum rates are not violated in any of the rate increases or decreases. Figure 10 shows a rate table that the Sarkar mobile station may store in its memory.

None of this is seen to disclose determining a virtual transmission time interval for a medium access control entity, as recited in each of the independent claims (slight variances in language).

The rejection asserts at page 3 that a MAC entity of the Sarkar mobile station determines a current transmission rate, and the allowable rate corresponds to the claimed virtual transmission time interval. More specifically at page 4 the office action clarifies that when the Sarkar "mobile station is transmitting autonomously, transmitting packets at the determined autonomous transmission rate, meaning a next packet must wait an interval of time corresponding to the determined autonomous transmission rate before being transmitted."

This is simply the natural delay inherent in whatever rate the Sarkar mobile station is using; while one packet is being transmitted, the Sarkar transmitter is occupied and cannot transmit the next packet in the queue, and the speed at which the Sarkar mobile station runs through its queue is the transmission rate which Sarkar keeps between the maximum and minimum rates as shown at Figure 8.

But what is specifically claimed at claim 46, is that "for the case where it is determined that the medium access control entity **is not transmitting** in the current air interface transmission time interval, transmitting a next data packet after a period determined by the virtual transmission time has elapsed." To satisfy this would appear to require Sarkar to forego transmitting completely for a TTI, determine that a next packet is to be sent and then send that next packet after waiting some pre-determined period of time (since the virtual TTI is 'determined' in the first-recited element of claim 46 and the third-element quoted above draws antecedent basis from the first-recited element).

The rejection might imply that the lack of a Sarkar busy signal satisfies the claimed 'not transmitting' element of claim 46. That is incorrect. One of ordinary skill in the art recognizes a transmission time interval TTI to be fundamentally different than simply the inverse of the current or maximum data rate which is how the office action asserts Sarkar against TTI. Apart from a virtual TTI as claim 46 recites which is introduced by the present application, there is also recited a "current air interface transmission time interval" which is

well known in the prior art. The application makes clear the fundamental distinction between TTI and data rate in the background section, where at ¶0005 there is an example given where TTI=2 ms, and the worst case combined data rate is *n**45 kb/sec for n user equipments. This means that each UE transmits at a rate of 45 kb/sec. But since the PDU size is 360 bits, then each of those UEs is transmitting [(45 kb)/(360 bits)]*2 msec=.25 PDU in a single TTI of 2 ms. If TTI were simply the inverse of the transmission rate then either the rate or the PDU size at ¶0005 could not be as they are presented there. One of ordinary skill in the art reading the specification would not conflate TTI with the inverse of transmission rate, as the rejection does in applying Sarkar to the independent claims.

Independent claims 57, 68 and 79 distinguish over Sarkar for reasons similar to those detailed above for claim 46. No other reference of record is seen to cure this shortfall of Sarkar, and so each independent claim is patentable over the cited art. All dependent claims are patentable at least for that dependency.

Dependent claim 48 is amended to add that the virtual transmission time interval is an integer multiple of the current air interface transmission time interval. Support may be seen at least at ¶0044 (10 ms TTI and 40 ms virtual TTI). Sarkar cannot be said to disclose this subject matter or to render it obvious, because Sarkar makes the rate adjustment, which is incremental, on a per packet basis (see Figure 8). Only by a continuous string of packets by which the rate is decreased on each packet can the starting rate be a multiple of the ending rate so as to read on this integer multiple element (assuming arguendo that the TTI is considered as the inverse of the rate as the rejection appears to assert).

In this case, then claim 48 distinguishes on two grounds. First, to meet the integer multiple element, the rate must continually decrease with each packet for a string of packets, but there is a busy signal when the rate is decreased which is opposite the independent claim's recitation of 'not transmitting'. Second, the net change that Sarkar would require to achieve the integer multiple element of claim 48 can occur only over a plurality of packets since each packet can yield only an incremental rise or drop in data rate. But claim 46 recites transmitting **a next data packet** after a period determined by the virtual transmission time. The term next cannot be broadened to mean simply some subsequent packet, and so there is no 'next packet' even by the office action's reading of Sarkar that could be at such a disparate rate than the packet immediately prior.

Claims 59, 70 and 82 are amended similar to claim 48 and distinguish over Sarkar alone or in combination with any other reference, for reasons cited above for claim 48.

All claims are now in condition for allowance, and the Applicants respectfully request the Examiner withdraw all outstanding rejections and to pass claims 46-82 to issue. The undersigned representative welcomes the opportunity to resolve any matters that may remain, formal or otherwise, via teleconference at the Examiner's discretion.

Respectfully submitted:

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